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COMPUTER-ASSISTED AUDITING TOOLS ACCEPTANCE USING I-TOE: A NEW PARADIGM

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Abstract

This paper presents a new adoption framework i.e. Individual, Technology, Organization and Environment (I-TOE) to address the factors influencing computer-assisted auditing tools (CAATs) acceptance in public audit firms. CAATs are audit technology that helps in achieving effective and efficient audit work. While CAATs adoption varies among audit departments, prior studies focused narrowly on CAATs acceptance issues from the individual perspective and no comprehensive study has been done that focused on both organization and individual standpoints. Realizing this gap, this paper aims to predict CAATs adoption factors using the I-TOE framework. I-TOE stresses on the relationship of Individuals factors (i.e. performance expectancy, effort expectancy, social influence, facilitating condition, hedonic motivation and habit), CAATs Technology (i.e. technology cost-benefit, risk and technology fit), Organization characteristics (i.e. size, readiness and top management), and Environment factors (i.e. client's AIS complexity, competitive pressure and professional accounting body regulations) towards CAATs acceptance. It integrates both Unified Theory of Acceptance and Use of Technology 2 and Technology-Organization-Environment framework. I-TOE provides a comprehensive model that helps audit firms and regulatory bodies to develop strategies and policies to increase CAATs adoption. Empirical study through questionnaire survey will be conducted to validate I-TOE model.

Keywords: Audit technology, Organization Technology Acceptance, Technology-Organization-Environment framework, UTAUT2 model

1 INTRODUCTION

Computer-assisted-auditing tools (CAATs) are audit technology that internal and external auditors use in auditing an organization's information system (Braun & Davis, 2003; Janvrin, Lowe & Bierstaker, 2009). CAATs are essential tools in auditing profession to achieve audit's test of controls and substantive testing tasks. The audit tools support in efficiency and effectiveness of audit work by automating manual audit activities (Braun & Davis, 2003; Curtis & Payne, 2008). CAATs are defined as "any use of technology to assist in the completion of an audit". It can be referred from basic spread sheet and statistical analysis software used in audit work to a more advanced and specialized databases and business intelligence audit software applications such as Generalized Audit Software (GAS). CAATs also comprise of tools and techniques that are used to extract, analyse and review logic of processed data (Debreceny, Lee, Neo & Toh, 2005). CAATs can reduce audit cost incurred and improve audit quality and productivity (Banker, Chang & Kao, 2002). Additionally, CAATs help audit firms to satisfy clients' demand for fast audit result and reliable audit procedures (Bierstaker, Burnaby & Thibodeau, 2001).

In this research, accounting firms are studied because accounting firms are the main external expertise that most Malaysian companies (large and small) and public organizations rely on to conduct external assurance services (Ismail, 2009; Ong, Azmi, Isa, Jusoh & Kamarulzaman, 2009). They trust audit firms' professional audit services to improve the quality of both financial and non-financial for decision making (Ismail, 2009) and perform audit procedures efficiently and effectively. Besides, the interests of organizations' stakeholders (shareholders, creditors, government regulatory bodies and the public) are represented by the independent external audit work (Hall, 2008). External auditing is done to ensure that financial statements are fairly presented and free from fraud. More importantly, as many organizations implement computerized accounting information system (AIS) and e-business, audit firms should move together with their clients by adopting CAATs.

1.1 Research Questions

CAATs bring vast opportunities in audit profession; however, despite the benefit of CAATs, the investment and acceptance of CAATs among audit firms remains contentious (Mahzan & Verankutty, 2011). CAATs implementation is not extensively utilized among public accounting firms (Curtis & Payne, 2008). In Malaysia, despite the high usage of computerized AIS among businesses (Ismail, 2009), the use of CAATs in audit firms is still minimal (Ismail & Zainol Abidin, 2009). Only 16% of audit firms responded that they provide audit and assurance services using CAATs. Prior studies investigated CAATs' acceptance in internal audit settings focusing on internal auditor's perspective (Mahzan & Verankutty, 2011). Very limited studies have been done on assessing both individual auditors and audit firms' acceptance of CAATs. Therefore, the key research questions are as follows:

1. How to increase adoption of CAATs among public audit firms in Malaysia?
2. What are the individual auditor's factors that will encourage/discourage adoption of CAATs?
3. What are the audit firms' factors (including technology, organization and environment context factors) that will encourage/discourage adoption of CAATs?
4. What recommendations and policies that could be introduced to increase CAATs adoption among public audit firms?

1.2 Research Objectives

This research aims to investigate the adoption of CAATs among audit firms. Specifically, the objectives are as follows:

1. To investigate the I-TOE factors influencing the audit firms' intention to adopt CAATs.
2. To investigate the interrelationship among the I-TOE factors.

1.3 Significance of study

The present study is important as the quick growth of computerized AIS in business results in higher demand in the use of CAATs for auditing and internal control assessment. Audit firms have to adopt CAATs to be competitive. By investigating the determinants of CAATs adoption, recommendations and policies can be developed to address the factors that hinders adoption and to leverage on the factors that increase adoption. From the academic point of view, the new model for organization adoption, which takes into consideration of the influence of individual employee's technology acceptance, is a novel idea and can be used for organization's adoption of other technologies.

2 LITERATURE REVIEW

2.1 Acceptance of CAATs

There are many studies related to CAATs acceptance by individual auditor (Mahzan & Lymer, 2009; Braun & Davis, 2003; Janvrin et al., 2009). A survey among state governmental auditors discovered that auditors lack confidence in using CAATs although they are aware of the potential benefits (Braun & Davis, 2003). They lack the technical competencies and face technical problems. Mahzan and Lymer (2009) studied the motivational factors of CAATs adoption among internal auditor. They measured auditor's performance expectancy, effect of externalities and facilitating conditions factors. It was found that the three factors significantly influence CAATs adoption. Nonetheless, the result could not be generalized due to small sample size. Additionally, most of the previous studies focused on individual acceptance (using UTAUT model). Very few studies investigate CAATs adoption among audit firms (Janvrin et al., 2008; Bierstaker et al., 2001). It is important to examine organization's perspective on CAATs because audit firms will ultimately decide on CAATs investment and provide the organizational and technical infrastructure for individual auditors to adopt CAATs successfully. Therefore, both individual and organization's adoption factors are important.

2.2 Theoretical Background

2.2.1 Unified Theory of Acceptance and Use of Technology (UTAUT)

Venkatesh, Morris, Davis and Davis (2003) developed UTAUT that integrates the similarities and differences elements from eight theories (Theory of Reasoned Action, Technology of Acceptance Model, Motivational Model, Theory of Planned Behaviour, Model of Personal Computer Utilization, a combined Theory of Planned Behaviour and Technology Acceptance Model, Innovation Diffusion Theory and Social Cognitive Theory). Venkatesh et al., (2003) asserted that behavioural intention to use a technology by individual in an organization is influenced directly by performance expectancy, effort expectancy and social influence. Intention to use behaviour and facilitating conditions will ultimately then influence IT usage behaviour. UTAUT2 (Venkatesh, Thong & Xu, 2012) extended UTAUT for individual technology consumer by incorporating hedonic motivation, price value and habit to the original UTAUT. They also found that facilitating conditions also influence consumer's behavioural intention to use a technology. UTAUT is a useful underlying theory to determine individual auditor's acceptance of CAATs which could influence the organization's acceptance of the technology.

2.2.2 Technology-Organization-Environment framework (TOE)

Tornatzky and Fleischer (1990) developed TOE framework to addresses technological, organizational and environmental influence on firm's adoption of technology. Technological context refers to the technology characteristics, e.g. in the case of CAATs adoption, audit firm has to assess technology cost-benefit, technology-task fit and risk. Decision to use CAATs depends on whether the technology matches audit tasks with consideration of cost-benefits and the potential risks of using the technology.

Next, organizational context refers to the organization measures such as firm size, the centralization, formalization and complexity of managerial structure, the quality of human resource and availability of resources. While in environment context, TOE embraces that organization has to conduct its business within its industry, competitors, suppliers and government. For this study, TOE framework is applied because it addresses the adoption of technology from firm's level.

3 PROPOSED METHODOLOGY

3.1 Research Hypotheses and Framework

3.1.1 Individual Factors: Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, Hedonic Motivation and Habit

Performance expectancy is defined as the degree to which user believes that using CAATs will help them achieve improvements in audit job performance. If an auditor's performance expectancy increases, then auditor's intention to use CAATs would increase. Performance expectancy adapts perceived usefulness, extrinsic motivation, job fit, relative advantage and outcome expectation constructs, in order to predict the intention to use a system (Venkatesh et al., 2003). Therefore, it is anticipated that:

H1: External auditor's performance expectancy positively affects intention to use CAATs.

Relative advantage such as cost saving, time saving and productivity enhancement affect technology adoption rate. Thus, if CAATs' cost-benefit increases, then auditor's performance expectancy would increase. Therefore, this research posits that:

H2: Performance expectancy is positively influenced by CAATs technology cost-benefit.

Effort expectancy is defined as the degree of ease associated with the use of CAATs. Smith, Abdullah and Razak (2008) found that system's ease of use is the main reason for technological adoption in management accounting. Perceived ease of use of the technology directly influences intention to use a system and finally affect actual system use (Venkatesh et al., 2003). Users would have intention to use an IT/IS if they believe it would help them perform their work task easily and reduce work hassle. It is found that electronic presentation of accounting information through the use of CAATs helps auditors in their decision making process (Banker et al., 2002). Therefore, it is posited that:

H3: Effort expectancy positively affects external auditor's intention to use CAATs.

Social influence is defined as the degree of influence from others in adopting CAATs. Social influences have significant effect on user's intention to use an IT (Venkatesh et al., 2003). Therefore, it is posited that:

H4: Social influence positively affects external auditor's intention to use CAATs.

Auditors have a tendency to use new audit technology (such as CAATs) if the firm's managing partner is encouraging the use of the technology (Curtis & Payne, 2008). If external auditor perceives that others (e.g. colleagues and top management) believe him/ her to use CAATs, then external auditor would be influenced to adopt CAATs. Therefore:

H5: Social influence is positively influenced by top management's support.

Facilitating conditions is the degree to which the user believes that infrastructure in organization and technical infrastructure exists to support user to use technology (Venkatesh et al., 2012). Mahzan and Lymer (2009), and Janvrin et al. (2009) found that facilitating conditions (e.g. organizational physical facility and technological infrastructure) influence CAATs adoption among auditors. Thus, this study hypothesizes that:

H6: Facilitating conditions positively affects external auditor's intention to use CAATs.

Organization's readiness through the providence of staff training and technology maintenance support would boost individual motivation to use a technology (Venkatesh et al., 2003). If an audit firm is ready to adopt CAATs, it will prepare the necessary computer infrastructure and provide maintenance and training support. Hence, it is posited that:

H7: Facilitating conditions are positively affected by organization readiness.

Venkatesh et al., (2012) found that hedonic motivation influence behavioural intention to use a technology. In CAATs adoption context, hedonic motivation is defined as the perceived pleasure of using CAATs by individual auditor. If an auditor feels that it is 'cool' to use the features, functions and interface of CAATs, then hedonic motivation would increase the auditor's intention to use CAATs. Thus, it is hypothesized that:

H8: Hedonic motivation positively influences external auditor's intention to use CAATs.

Habit influences behavioural intention to use a technology (Venkatesh et al., 2012). In CAATs adoption context, habit is defined as the extent to which individual auditor tends to use CAATs automatically due to prior usage behaviour. It is anticipated that if an auditor has a habit to use technology in audit process (e.g. spreadsheet & statistical software), he/she will likely have intention to use CAATs. Thus, it is hypothesized that:

H9: Habit positively influences external auditor's intention to use CAATs.

Audit firms rely on individual auditors as their employees in performing an audit engagement (Curtis & Payne, 2008). If the individual auditor intends to use CAATs to perform audit work due to the technology's cost benefits and ease of use, the auditor will influence the audit firm's intention to invest in CAATs. Thus, it is hypothesized that:

H10: Individual auditor's intention to use CAATs positively influences audit firm's intention to use CAATs.

3.1.2 Technology Factors: CAATs Cost-benefit, CAATs Risk and CAATs Task Fit

Rushinek and Rushinek (1995) suggested that cost, trouble-free installation, ease of use, on-disk tutorial, and error recovery should be considered when adopting accounting software package. Tan, Teo and Lai (2011) measured technology performance through cost effectiveness. Thus, it is posited that:

H11: CAATs cost-benefit positively affects intention to use CAATs

Technology risk is the degree of perceived risks of using CAATs such as computer fraud threat and inadequacies in controls and it could affect firm's intention to use the technology (Hall, 2008; Romney & Steinbart, 2006). Therefore, it is anticipated that:

H12: CAATs risk negatively affects audit firm's intention to use CAATs

Task-technology fit is the degree to which the use of CAATs will match the audit tasks. It is posited that the higher the task-technology fit, the more acceptable the technology is. DeLone and McLean (2003) defined task-technology fit as the nature, extent, quality and appropriateness of system use. Goodhue and Thompson (1995) believed that IT is more likely to be used if the IT matches the tasks that it must perform. Hence:

H13: CAATs task-technology fit positively affects audit firm's decision to use CAATs

Additionally, it is posited that the more CAATs fit the auditor's tasks, the easier it is for him/ her to use the technology. Hence,

H14: CAATs task-technology fit positively affects individual auditor's effort expectancy

3.1.3 Organization: Size, Readiness and Top Management Support

Firm's size has been regularly documented as an antecedent to technology adoption (Zhu, Kremer & Xu, 2003). Audit firm's size may influence IT usage due to the resources and support available in the firm (Janvrin et al., 2008). Therefore, it is posited that:

H15: Audit firm's size positively affects audit firm's decision to adopt CAATs

Firm's readiness is defined as the firm's financial and technological resources (Iacovou, Benbasat & Dexter, 1995). With such resources, a firm can equip its organization with technological facility and internal environment to support technology adoption. Therefore, it is posited that:

H16: Organization's readiness positively affects audit firm's decision to adopt CAATs

Organization's top management commitment is the degree of top management involvement and support in adopting CAATs. Involvement of top management in firm's ICT project would result in better selection, investment and implementation of ICT in the firm (Salleh, Che Rose, Kumar & Peng, 2007). Curtis and Payne (2008) argued that auditors have a tendency to use a new technology if the firm's partner is supporting the use of the technology. Therefore, it is posited that:

H17: Organization's top management commitment positively affects audit firm's decision to use CAATs

3.1.4 Environment: Client AIS Complexity, Competitive Pressure and Professional Accounting Body Regulations

It is posited that client's business complexity affects audit firm's intention to adopt CAATs. Complex businesses would require audit firms to adopt CAAT because of the need for computer to process high volume of accounting records during audit. Client's business complexity may be characterized by client's business size, transaction process volume and industry type. As asserted by Janvrin et al. (2008), client's IT complexity is found to be associated with audit firm's IT usage. Hence, this hypothesis is established:

H18: Client's AIS complexity positively affects audit firm's intention to use CAATs

Competitive pressure is defined as the level of CAATs adoption of competitors. As more competitors adopt IT, firms are more likely to adopt IT to maintain their competitive position (Iacovou et al., 1995; Zhu et al., 2003). Therefore, this study hypothesizes that:

H19: Competitive pressure positively affects audit firm's intention to adopt CAATTs

Public audit firms have to comply with regulations and standards of practice that are established by professional accounting bodies, for example American Institute of Certified Public Accountants (AICPA), International Federation of Accountants (IFAC), Information Systems Audit and Control Association (ISACA) and Malaysian Institute of Accountants (MIA). The standards are issued to help in maintaining accounting and auditing professions credibility, increasing awareness on new emerging technologies and informing accounting issues (AICPA, 2011). It is anticipated that if professional accounting bodies encourage public audit firms to adopt audit technologies, then it will increase audit firms' acceptance on CAATs. Therefore:

H20: Professional accounting body standards positively affect audit firm's intention to use CAATs

Based on these hypotheses, Figure 1 illustrates the research framework.

3.2 Research Methodology

The unit of analysis for this study is audit firms in Malaysia. The Malaysian Institute of Accountants (MIA) Member Firms Directory will be used as the sampling frame. This directory provides addresses and partners' names of all active audit and non-active audit firms in Malaysia. The directory lists a

total of 1,367 audit firms and a sample of 500 firms will be selected using stratified random sampling. A survey will be conducted through mail questionnaires that are developed based on the literatures. The mail survey will be targeted to audit firm's managers/ supervisors because they are perceived as the knowledgeable and important person in the firms, therefore they will be likely to have valid perception of IT adoption (Chong, Chong & Yeow, 2006; Trites, 2004). The managers/ supervisors are also auditors in the firm; hence they will represent the individual auditor's intention to use CAATs. The data will be analysed using Structured Equation Modelling (SEM) to test H1-H20.

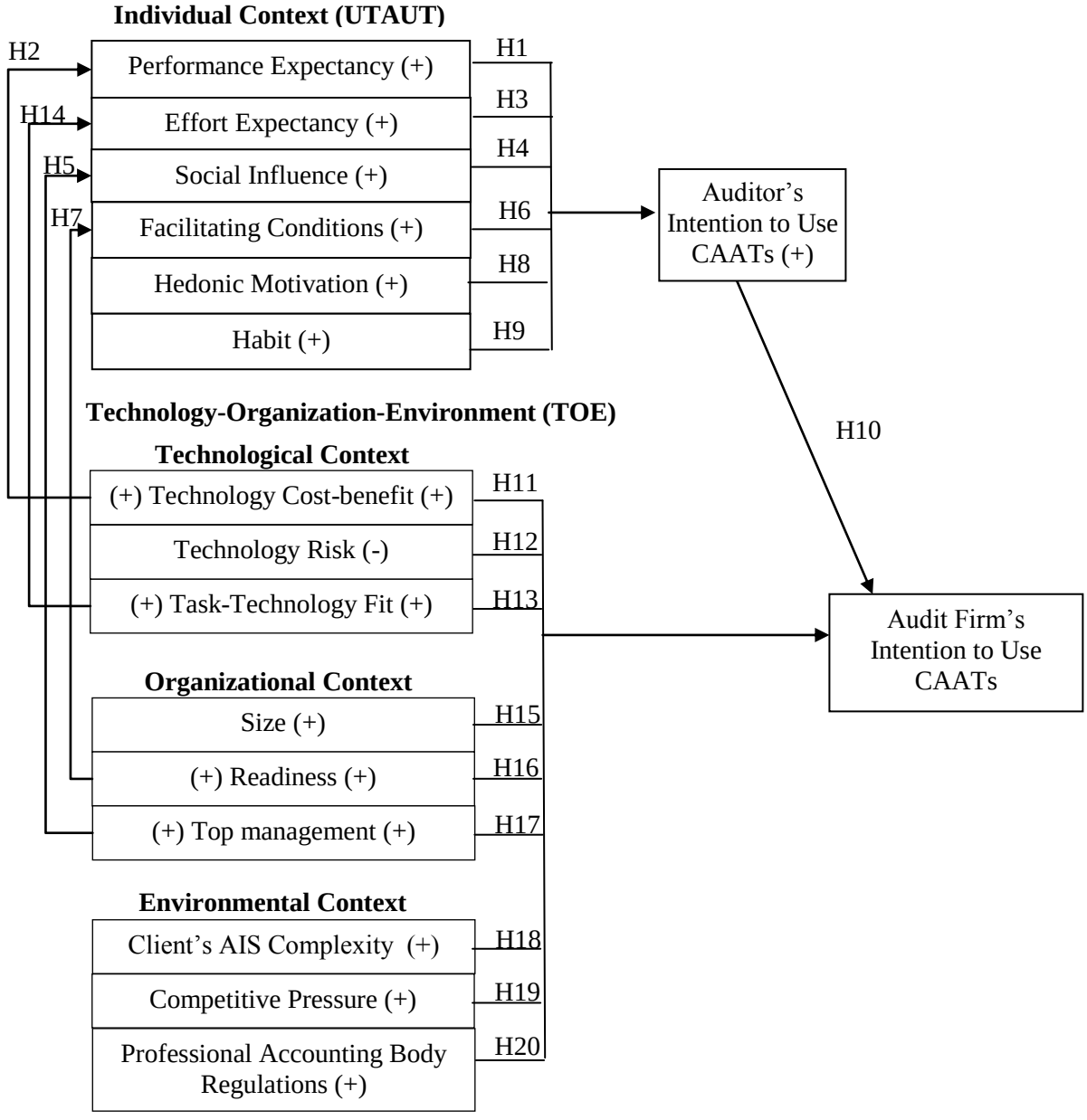

Figure 1. Research Framework for CAATs Acceptance using I-TOE

4 CURRENT STAGE AND PLANS FOR COMPLETION

This research is currently in the proposal stage. The PhD research will be completed within a 3-year period.

5 CONCLUSION

This research presents a new organization adoption framework that incorporates individual, technological, organizational and environmental contexts. It is believed that acceptance of CAATs does not merely rely on individual auditor's intention but also depends on organization's factors. The study adapts UTAUT2 and TOE framework as the underpinning theories. This study contributes to enrich adoption literature and accounting professional practice by presenting a better understanding on predicting CAATs adoption factors that are essential to public accounting firms.

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